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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/408,149	09/29/1999	BHIMSEN BHANJOIS	07575/034001	3652

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EXAMINER
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ALI, SYED J

ART UNIT	PAPER NUMBER
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2127

DATE MAILED: 01/30/2004

14

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/408,149

Applicant(s)

BHANJOIS ET AL.

Examiner

Syed J Ali

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This office action is in response to Amendment B, paper number 11, which was received December 3, 2003. Claims 1-33 are presented for examination.
2. The text of those sections of Title 35, U.S. code not included in this office action can be found in a prior office action.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 18, 23-24, and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 18 recites the limitation "The operating system of claim 17" in line 1. There is insufficient antecedent basis for this limitation in the claim. Hereinafter, the above limitation will be interpreted as though it read, "The method of claim 17".

Claims 23-24 recite the limitation "The method of claim 12" in line 1. There is insufficient antecedent basis for this limitation in the claims. Hereinafter, the above limitation will be interpreted as though it read, "The system of claim 22".

Claim 28 recites the limitation “The operating system of claim 17” in line 1. There is insufficient antecedent basis for this limitation in the claim. Hereinafter, the above limitation will be interpreted as though it read, “The system of claim 27”.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-4, 9-14, 19-24, and 29-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Yodaiken (USPN 5,995,745).

As per claim 1, Yodaiken discloses an operating system, comprising:

a non-preemptive microkernel executing one or more processes in accordance with a predetermined priority (col. 4 line 49 - col. 5 line 2, “A simple priority-based preemptive scheduler is currently used in RT-Linux. It is implemented as a routine that chooses among the ready process the highest-priority one and marks it as a next process to execute. Tasks give up the processor voluntarily, or are preempted by a higher priority task when its time to execute comes”, “the real-time kernel itself is not preemptable”, wherein a task yielding the processor voluntarily is a non-preemptive mode of operation); and

one or more kernels each being executed as a process by the non-preemptive microkernel (col. 2 lines 6-16, "A real time operating system is provided for running real time tasks. A general purpose operating system is provided as one of the real time tasks", wherein the general purpose operating system is Linux operating in a non-preemptable kernel mode).

As per claim 2, Yodaiken discloses the operating system of claim 1, wherein one of the kernels executes an operating system as a dependent process (col. 2 lines 6-16, "A real time operating system is provided for running real time tasks. A general purpose operating system is provided as one of the real time tasks").

As per claim 3, Yodaiken discloses the operating system of claim 2, wherein the operating system is a time-sliced operating system or a microkernel (col. 4 lines 55-63, "In RT-Linux this tradeoff is resolved by using a one-shot timer instead of a periodic clock. Tasks are resumed in the timer interrupt handler precisely when needed").

As per claim 4, Yodaiken discloses the operating system of claim 2, wherein the operating system is Unix (col. 3 lines 36-53, "In a particular embodiment of the present invention as discussed below, the process is applied to the Linux operating system, a UNIX-derivative operating system that is publicly available").

As per claim 9, Yodaiken discloses the operating system of claim 1, wherein the processes never terminate (col. 4 line 49 - col. 5 line 2, "the real time kernel itself is not

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preemptable”, wherein the kernel is responsible for scheduling all other processes, and thus continues to run for as long as is necessary).

As per claim 10, Yodaiken discloses the operating system of claim 1, wherein one of the kernels is a microkernel (col. 1 lines 60-63, “it is an object of the present invention to operate a real-time operating system, or executive, and retain the capabilities offered by a general purpose operating system”, wherein the Linux kernel implements basic features of the main kernel, and thus falls under the definition of a microkernel).

As per claims 11-14 and 19-20, Yodaiken discloses a method for operating a computer system in accordance with the operating system of claims 1-4 and 9-10, respectively (col. 3 lines 36 - col. 4 line 63, wherein the method of implementing the operating system is disclosed).

As per claims 21-24 and 29-30, Yodaiken discloses a computer system for implementing the operating system of claims 1-4 and 9-10, respectively (Abstract, wherein the operating system disclosed is a “computer” operating system, and is designed for implementation on a computer system).

### ***Claim Rejections - 35 USC § 103***

7. Claims 5-7, 15-17, 25-27, and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yodaiken in view of Hitz et al. (USPN 5,845,579) (hereinafter Hitz).

As per claim 5, Hitz discloses the operating system of claim 1, wherein each process has its own stack (col. 11 line 64 - col. 12 line 21, "Logically concurrent executions of the code making up the NFS stack are supported by reference to the process context in which execution by the peer-level processor is performed").

It would have been obvious to one of ordinary skill in the art to combine Yodaiken with Hitz since it would provide additional functionality in terms of permitting simple communication between executing processes. Specifically, Yodaiken provides a way of executing a kernel as a process, wherein the kernel executes real time processes that yield voluntarily. However, in real time systems, it is a common occurrence that a specific process has a hard deadline, and needs to execute immediately. Since the tasks are not preemptable, preemption functionality would have to be implemented in the kernel via an interrupt mechanism. By implementing the messaging kernels of Hitz, this need is eliminated. Rather than interrupting the currently executing process to request the processor, a message could be sent via the messaging kernel that a real time process requires the processor. Currently executing processes may check the message queue for such requests, and voluntarily yield the processor to the higher priority task.

As per claim 6, Hitz discloses the operating system of claim 1, wherein the processes communicate using one or more messages (col. 18 lines 11-25, "An inter-facility communication [IFC] control data block is provided, again followed by any necessary fill characters needed to complete the 128-byte long message. This IFC control data preferably includes a copy of the address of the original message, the relevant sending and receiving [destination] process

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identifiers associated with the current message, and any queue links required to manage the structure while in memory”).

It would have been obvious to one of ordinary skill in the art to combine Yodaiken with Hitz for reasons discussed above in reference to claim 5.

As per claim 7, Hitz discloses the operating system of claim 1, wherein each process has a unique process identifier [PID] (col. 11 line 64 - col. 12 line 21, “Each process is uniquely identified by a process ID [PID]”).

It would have been obvious to one of ordinary skill in the art to combine Yodaiken with Hitz for reasons discussed above in reference to claim 5.

As per claims 15-17, Yodaiken discloses a method for operating a computer system in accordance with the operating system of claims 5-7, respectively (col. 3 lines 36 - col. 4 line 63, wherein the method of implementing the operating system is disclosed).

As per claims 25-27, Yodaiken discloses a computer system for implementing the operating system of claims 5-7, respectively (Abstract, wherein the operating system disclosed is a “computer” operating system, and is designed for implementation on a computer system)

As per claim 31, Yodaiken discloses a computer, comprising:

a non-preemptive microkernel executing one or more processes in accordance with a predetermined priority (col. 4 line 49 - col. 5 line 2, “A simple priority-based preemptive



scheduler is currently used in RT-Linux. It is implemented as a routine that chooses among the ready process the highest-priority one and marks it as a next process to execute. Tasks give up the processor voluntarily, or are preempted by a higher priority task when its time to execute comes”, “the real-time kernel itself is not preemptable”, wherein a task yielding the processor voluntarily is a non-preemptive mode of operation); and

one or more kernels each being executed as a process by the non-preemptive microkernel (col. 2 lines 6-16, “A real time operating system is provided for running real time tasks. A general purpose operating system is provided as one of the real time tasks”, wherein the general purpose operating system is Linux operating in a non-preemptable kernel mode).

Hitz discloses the following limitations not shown by Yodaiken, specifically an interconnect bus (Abstract, “The computer system includes...a communications bus for interconnecting the processor units”);

one or more processors coupled to the interconnect bus and adapted to be configured for server-specific functionalities including network processing, file processing, storage processing, and application processing (Abstract, “The computer system includes a plurality of processor units for implementing a predetermined set of peer-level facilities wherein each peer-level facility includes a plurality of related functions and a communications bus for interconnecting the processor units. Each of the processor units includes a central processor”);

a configuration processor coupled to the interconnect bus and to the processors, the configuration processor dynamically assigning processor functionalities upon request (col. 19 lines 7-26, “This message, in accordance with the present invention, is generally initiated in response to the same function call that the facility would make in a uniprocessor configuration of

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the prior art. That is, in a conventional single processor software system, execution of a desired function may be achieved by calling an appropriate routine, that, in turn, determines and calls its own service routines”, wherein each processor has the capability to function as a configuration processor); and

one or more data storage devices coupled to the processors and managed by a file system (Fig. 1, elements 161, 162, 241, and 242).

It would have been obvious to one of ordinary skill in the art to combine Yodaiken with Hitz for reasons discussed above in reference to claim 5.

As per claim 32, Yodaiken discloses the computer of claim 31, wherein the microkernel executes an operating system as a dependent process (col. 2 lines 6-16, “A real time operating system is provided for running real time tasks. A general purpose operating system is provided as one of the real time tasks”).

8. Claims 8, 18, 28, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yodaiken in view of Hitz in view of Magee (previously cited).

As per claim 8, Magee discloses the following limitations not shown by the modified Yodaiken, specifically the operating system of claim 7, further comprising a mailbox coupled to a plurality of processes to service messages sent to a single PID (col. 10 line 55 – col. 11 line 15, “Only one task can hold the receive right for a port...Multiple tasks can hold send rights to the port”, col. 21 lines 55-62, “a microkernel tasks interacts with its environment purely by sending

messages and receiving replies. These messages are sent using ports,” wherein the method of Magee clearly implements the idea of a mailbox to facilitate inter-process communication, with many processes able to send messages to a single process based on its identifier. Further, the mailbox being claimed and the port in Magee serve the same purpose, and are thus not patentably distinct).

It would have been obvious to one of ordinary skill in the art to combine the modified Yodaiken with Magee since the messaging system disclosed by Hitz is handled such that each individual message is communicated individually. However, a situation may arise such as a large number of messages arriving before the receiving process is able to process the incoming messages. This could lead to failure conditions such as messages being dropped. Therefore, the addition of Magee would allow incoming messages to be stored in a mailbox while awaiting processing, and would allow a process to communicate with a mailbox to ease the communication burden on individual processes.

As per claim 18, Yodaiken discloses a method for operating a computer system in accordance with the operating system of claim 8 (col. 3 lines 36 - col. 4 line 63, wherein the method of implementing the operating system is disclosed).

As per claim 28, Yodaiken discloses a computer system for implementing the operating system of claim 8 (Abstract, wherein the operating system disclosed is a “computer” operating system, and is designed for implementation on a computer system)

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As per claim 33, Magee discloses the following limitations not shown by the modified Yodaiken, specifically the computer of claim 31, wherein the microkernel executes a network switch operating system as a dependent process (col. 6 line 66 – col. 7 line 2, “the microkernel 120 and personality-neutral services 140 run multiple operating system personalities”, wherein the microkernel is well known in the art to execute processes or kernels, and the method of Magee is designed to be able to implement several operating systems, including that of a network switch).

It would have been obvious to one of ordinary skill in the art to combine the modified Yodaiken with Magee for reasons discussed above in reference to claim 8.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (703) 305-8106. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T An can be reached on (703) 305-9678. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.



Syed Ali  
January 22, 2003